

UNIVERSITY OF BUEA



BACHELOR OF ENGINEERING PROGRAM
FACULTY OF ENGINEERING AND TECHNOLOGY
INTERNSHIP REPORT ON

**HOSPITAL APPOINTMENT
SCHEDULER SYSTEM (HASS)**

Offered by



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Performed at: MegaSoft Sarl

Mokolo, Yaounde. Cameroon

In partial fulfillment of the requirements of the Bachelor of Engineering Program in Computer Engineering

Report of Internship from 8th of September 2015 to 8th of February 2016

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Academic Supervisor:

FINAL YEAR INTERNSHIP REPORT

DECLARATION

This report has been written by me and has not received any previous academic credit at this or any other institution.

Signature

.....

Ngong Ivoline-Clarisse Kieleh

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ACKNOWLEDGEMENT

Firstly, I thank the almighty God for seeing me through this internship period and giving me the strength and willpower to continue when I had none. I'm also very grateful to my parents and family for their prayers, motivation and financial aid during my internship. I take advantage of this opportunity to say thanks to:

Dr. Moukoup Ibrahim, CEO of Megasoft for giving me the opportunity to have an invaluable experience in his enterprise.

Mr. Tedongmo Wilfried, my professional supervisor and Mr Fotso William, head of the web department for their technical knowhow and knowledge they have shared with me in the last five months. And to the Megasoft staff who took me as part of the family and for their sustained faith in my abilities.

I equally thank the administrative staff of FET who were always there for us whenever we needed their services and who kept us informed while we were away and finally, I thank all my friends for their support, encouragement and advice.

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LIST OF ABBREVIATIONS

CSS: Cascading Style Sheets

ER: Entity Relation

GUI: Graphical User Interface

HASS: Hospital Appointment Scheduler System

HTML: Hypertext Markup Language

ICT: Information and communications technology

IDE: Integrated Development Environment

IT: Information Technology

MDAL: MegaSoft Data Access Library

SQL: Structured Query Language

SRS: Software Requirement Specification

UML: Unified Modelling Language

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ABSTRACT

This report describes the work conducted during a five month internship at Megasoft SARL which was divided into 2 parts; Training and Problem solving.

Training, which required me to learn the organization's project documentation style and how to use the organization's framework, MDAL (Megasoft Data Access Library). This framework is a tool that aids in code organization, rapid development of applications and provides code libraries.

A hospital stay is often an unpleasant experience for a patient. Long waiting hours for previously booked appointments as well as delays in diagnosis and treatment are among the most common sources of frustration. This was the problem I was assigned to solve. This report therefore presents a hospital appointment scheduler system (HASS) which I developed to overcome this problem. A website and a desktop application were successfully developed using Java, Javascript, Html and CSS. Hence, using this system, patients can now book appointments at their own convenience, according to their own schedule and with a doctor of their own choosing. HASS is therefore a system that lies at the intersection of healthcare delivery and technology.

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CHAPTER 1: INTRODUCTION

1.1 Brief Introduction

A six month internship in an organization is one of the requirements for the award of a Bachelor of Engineering in Computer Engineering in FET(Faculty of Engineering and Technology), UB(University of Buea).

The interns are required to work on real world problems during this program. My internship placement was at Megasoft where I got the opportunity to observe and participate actively in the software engineering process. Mr. Tedongmo Wilfried, head of the technical department of Megasoft was my supervisor.

1.2 Company Information

1.2.1 Company Overview

Megasoft is a private company created in 2001 by 3 young Cameroonians who desired to make available in their country, an enterprise which not only develops applications that profit local companies and public administrations but also train passionate youths to learn ICTs.

Megasoft combines science, technology and management to produce the best services. Featuring a team of several employees with diverse skill sets, Megasoft combines expertise, technological mastery and teamwork skills for a single objective: the satisfaction of its customers.

1.2.2 Services

The goal of megasoft is to provide solutions for the vision of other organizations. Megasoft provides services and consultancy in technology, management, software and training. Megasoft offers a number of services which are shown in **Table 1**

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Table 1 Services provided by Megasoft

Softwares	IT services	Management Services	Training
Risk Management systems	Customized Software development	Risk management systems	ICT
Dashboard and performance management systems	Web Site development	Development of management indicators and monitoring	Risk Management
Time and activity management systems	Consulting, Auditing	Support for project management	Time management
Integrated management software packages (budget, purchasing, sales, inventory, maintenance, production ...)	Conception and realization of networks	Optimization of the production process	Project management
Payroll and Human Resources	Development of requirement specification	Optimization of the management process	Stock management
Customer relation management systems	Software and penetration testing	Strategy consulting and statistical studies	Cost Reduction in enterprises
Electronic document management system And much more	Information security in softwares and information systems	Development of management procedures	...
Decision management and business solutions: microcredit, pharmacies, publishers, lawyers, printers, aluminum carpentry and glazing, money transfer, messaging, dry cleaners, supermarkets, hospital management ...			

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1.2.3 Organization Chart

i. **The General Manager**

His/her main tasks are; defining the direction to follow, defining the main objectives of the company and finding and providing the means for achieving them

ii. **The Human Resources Manager**

His/her main objectives are:

- a. Mastering the personnel expenses and keeping them at a level consistent with MegaSoft's activities
- b. Ensuring compliance with laws and regulations on resource management of human resources (recruitment, compensation, retirement, relocation, internship)
- c. Promoting MegaSoft in an atmosphere conducive to good performance.

iii. **Technical Director**

This director is mainly responsible for the development of applications. His/her duties include:

- Validation of Software requirement specifications
- The deployment and maintenance of applications from clients.
- The drafting of computing resources and operation procedures.

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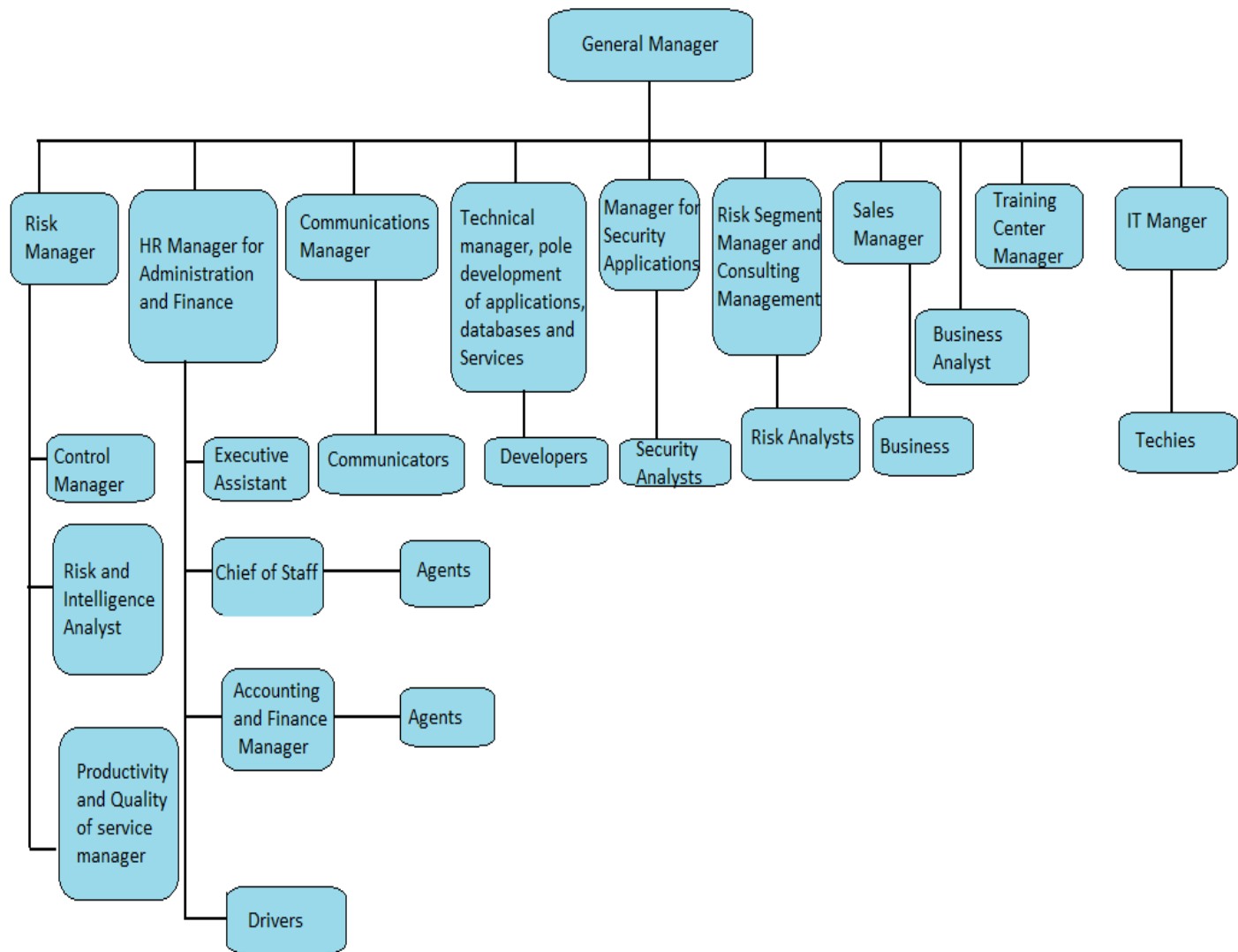


Figure 1 Organogram of Megasoft

1.3 Internship Objectives

The main objective of an internship is to let students or trainees gain practical experience. They are exposed to situations where they can use the knowledge got during training to provide solutions to problems. The Faculty of Engineering and Technology (FET) that seeks to train outstanding engineers, views internship as an opportunity for the students to gain first-hand experience on the way computer engineering activities are carried out in the industry.

Megasoft's main objective is to make students on internship attain a professional level in their field. The students are trained on technologies used by the company. During the training the students are exposed to situations which require knowledge acquired in and out of school to provide solutions.

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The internship is emphasises important professional skills like:

- Communication
- Team work
- Collaboration
- Persistency and concentration at work
- Respect of rules and regulations of the company

1.4 Internship Program

At Megasoft, students take a test, which they have to pass before they can be taken as interns .My internship which lasted from the 8th of September to the 8th of February (5 months) in Megasoft was divided into 2 main parts: training and Problem solving. These were in turn divided into phases as follows.

1.4.1 Training

- **Assimilation phase:** This was the first phase of the internship, where interns are given notes on the company's rules and regulation, project documentation style, daily report writing, introduction to technologies, subject, concept of the project and meetings were organized too. This took me the rest of the month of September.

- **Technology Mastery Phase:** Here, I got to not only understand the software and technologies used by the company but also built small systems using the software and technologies. 2 sample systems that were built :- **a student grade management system** and **a personnel management system**. This was done because the company has it's own framework called MDAL (Megasoft Data Access Library) which is used only in the company hence interns need some training on how the framework works, what it does and does not do.

Programming in a software company mostly requires development of softwares with almost the same structure, so instead of performing the same type of task again and again for the same type of applications, what you do is create a framework having all those facilities together in one nice packet, hence providing the abstraction for your application and more importantly many applications.

MDAL is a framework created by Megasoft with this objective. It is a library of software templates and has an architecture for rapid development of applications. In MDAL, both web and desktop applications can be developed at the same time. It has default templates which the developer can customize depending on the application the developer is working on. This makes building of applications very fast and organized. MDAL was built using java so a mastery of the java programming language is needed for a developer to master the framework. Other technologies used by the company which personnel are supposed to master include:

- Feem: Communication tool over a network
- Quick Organizer: Knowledge management tool created

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- L'horloge: Time management tool
- Cobian backup: Tool that permits effective backup of files

October was dedicated for completing this phase.

1.4.2 Project

- Problem Comprehension and Implementation phase:

This phase deals with the different approaches that can be used to solve a problem. Exploiting the functionality of similar projects and getting better acquainted with the problem at hand. I had to look around, search on existing solutions to take a decision on the best approach for the project. After understanding the problem at hand, I modelled and designed the system.

The implementation phase is the coding section of the project where various functionalities of the project were built. Here, I wrote the source code for the system.

- **Testing phase:** Different features and scenarios are tested.

- **Documentation:** For the reviewer (developers) and the company, the project needs to be documented. The documentation mostly include procedure for installing tools for development, source code commenting, final product proper documentation and user manuals.

1.5 Problem Statement

A hospital stay is often an unpleasant experience for a patient. Long waiting times for previously booked appointments as well as delays in diagnosis and treatment are among the most common sources of frustration. Even more striking is the fact that patients seem resigned to accept long waiting times when they seek health care.

In this fast driven society, where the current climate in the healthcare sector demands efficiency and patient satisfaction in medical care delivery, the numbers of missed appointments and unnecessary waste of patient's appointment time have caused an impending problem for healthcare institutions (Goldsmith, 2000). Hence, there is a need for an integrated healthcare system to intervene and facilitate health care provision for patients. Therefore, a hospital appointment scheduler system is crucial for the provision of efficient, flexible and timely access to health services.

CHAPTER 2: RELATED LITERATURE

Presented in this section is a review of some of these systems that already exist, their merits and demerits and how HASS overcomes some of these disadvantages

2.1 Paper based Appointment Booking Systems

This system is used by most hospitals in Cameroon. Here, appointments are managed manually, whereby patients have to be called in to schedule an appointment. The registration process often requires patients to fill up forms, submit to the registration table and wait for their names to be called. There is a high probability here that the card can be misplaced or taken by an unauthorized person. Moreover, files and patients health records are stored in physical storage and can easily get missing as they will be transferred by nurses or other medical staff to the doctor's office for consultation. Not forgetting the long queues patients have to wait in before they can be attended to. This system is obviously inefficient, time-consuming and the risk of misplacing records is transparent. Based on the survey report in 2007 (LaGanga & Lawrence, 2008), the greatest complain was the time spent in the waiting rooms. 19% of patients complained that they could not get an appointment within a weeks' time. In addition, thousands of patients' appointments were changed to a later date for more than once. This issue still remains a challenge to the healthcare industry worldwide.

2.2 Online Appointment Systems

An online system is also known as a web based system. A website is a set of related web pages typically served from a single web domain. According to Wikipedia, a website is hosted on at least one web server, accessible via a network such as the Internet or a private local area network through an Internet address known as a uniform resource locator (URL).

The Ingage Patient System developed by Ingage Patient is an online scheduling application that works for 24hours and 7 days a week. Here, a healthcare administrator is notified automatically on upcoming appointments and all the registered patients through the online system. It allows patients to complete registration forms at their own convenience thereby overcoming the queuing problem. Once it has been completed, the patient will be notified with a map to the nearest healthcare facility. However, there are some negative consequences for using this system. Firstly, this online registration platform requires payment of a monthly subscription fee to the provider. In addition, registration requires patients to fill in important data such as credit card number, identification card number, just to name a few. Since the system is web-based, these numbers can be hacked by malicious websites. Finally, this online scheduling system is only limited to less diagnosed symptoms such as abdominal pains, nausea, vomiting, diarrhoea and etc. So if there are symptoms which are not included on the list, patients have to call in for any available appointment slots and wait for confirmations. For such cases of emergency and urgent need of consultation, this inefficiency may lead to problems for both patients and healthcare staff.

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2.3 Mobile Appointment System

“Application of Intelligent Agents in Hospital Appointment Scheduling System” (Hylton & Suresh, 2012) developed employs an intelligent agent which eliminates the need of human agents. It therefore aims to improvise the work flow and thus saving the healthcare staff’s time and effort. This system is based on fixing the priority level of patients in appointment scheduling and it runs on android version 2.2 and above. There are some drawbacks found in this technology. First, non-registered patients are required to schedule an appointment at least 24 to 48 hours before the scheduled time. Once approved, they will automatically become a registered patient. In urgency cases, this technology obviously cannot be applied. Secondly, there are no automatic system calls as reminder before the schedule date which is as much important since it is a paperless network transaction.

2.4 Call Based And Text Based Booking

In the Convox Appointment Booking System by Deepija Telecom (P) Ltd., the user has an appointment number for the hospital. When the user makes the call, the call is transferred to a live operator and the operator will book an appointment for the caller. The integrated call centre appointment booking involves 3 easy steps where the user selects a desired option, call gets connected to a live operator and the operator books an appointment. The appointments are made in real time. With this system if there are connection problems the patient will find it difficult booking an appointment. In addition, the process becomes long and boring as the number of departments increase and given that the caller is sick he/she can easily lose concentration.

For the text based booking, patients enter a code for example *763*3# to book an appointment. A text message is sent back to the patient to enter the description of his/her problem. An appointment is then scheduled for the patient with any doctor as the patient can’t view the doctor’s schedule. Just like the call based booking system, the process can get too long for the user especially when the user is trying to view doctor’s schedules. If the user makes a mistake or a connection problem occurs, the user will have to start the process all over again.

2.5 Hospital Appointment Scheduler System (HASS)

HASS is an appointment management system and is meant to be a module in a hospital management system where a user can book, cancel and reschedule an appointment. It is assumed here that, each patient has a unique account in the hospital management system, through which he/she can book successive appointments and other hospital related issues. During the registration patients provide information like their names, phone numbers, email, addresses etc. which the HASS makes use of. HASS is a combination of a web based online appointment management system and a hospital interface application. Details of these 2 features of the HASS are given below:

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2.5.1 HASS – Web Based Application

The web based appointment system is easy to use. It involves 5 steps. A patient visits the website and does the following:

- I. Patient Logs in using pre-existing account
- II. Selects department – such as Consultation, Cardiac, Mental etc.
- III. Views schedule and selects suitable time and date
- IV. Request appointment (appointment is pending)
- V. Confirmation message is displayed to patient and also sent to his/her email

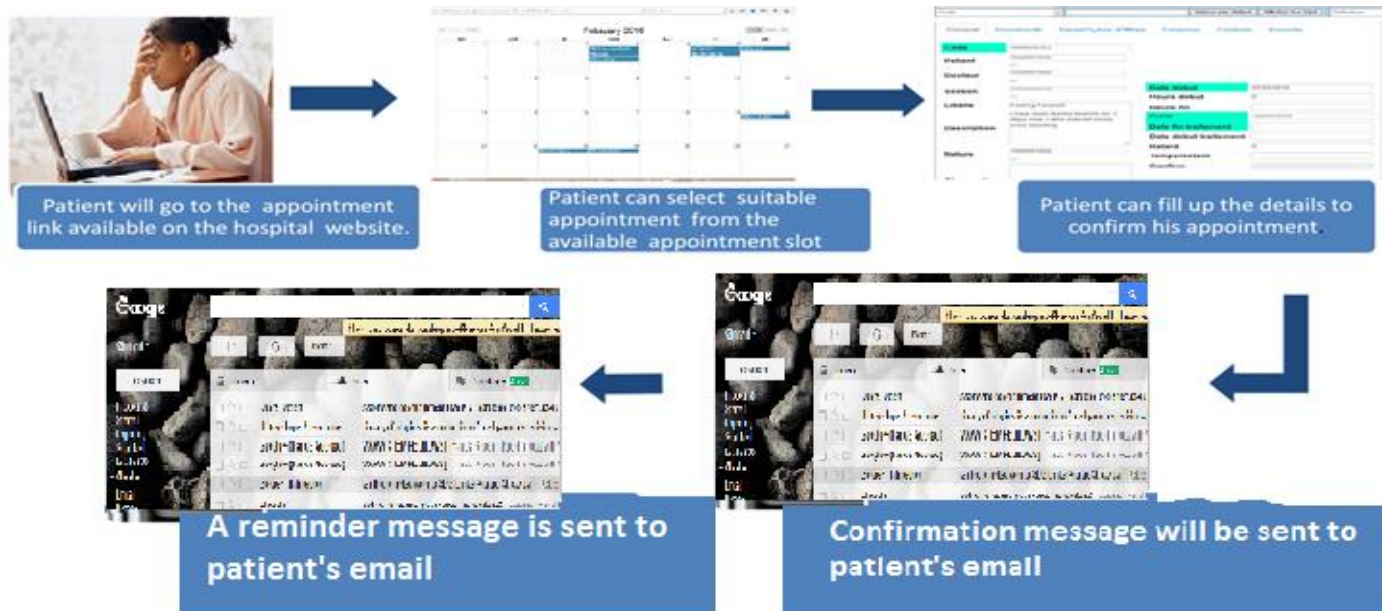


Figure 2 Web based HASS System

2.5.2 HASS – Hospital Interface Application

There will always be a need for walk-in patients where one of the hospital staff (doctor's assistant) enters the patient's information and books the appointment for the patient.

- I. Assistant logs in using pre-existing account
- II. Selects department – such as Consultation, Cardiac, Mental etc.
- III. Views schedule and selects suitable time and date
- IV. Request appointment (appointment is pending)

Confirmation message is displayed to assistant and also sent to patient's email.

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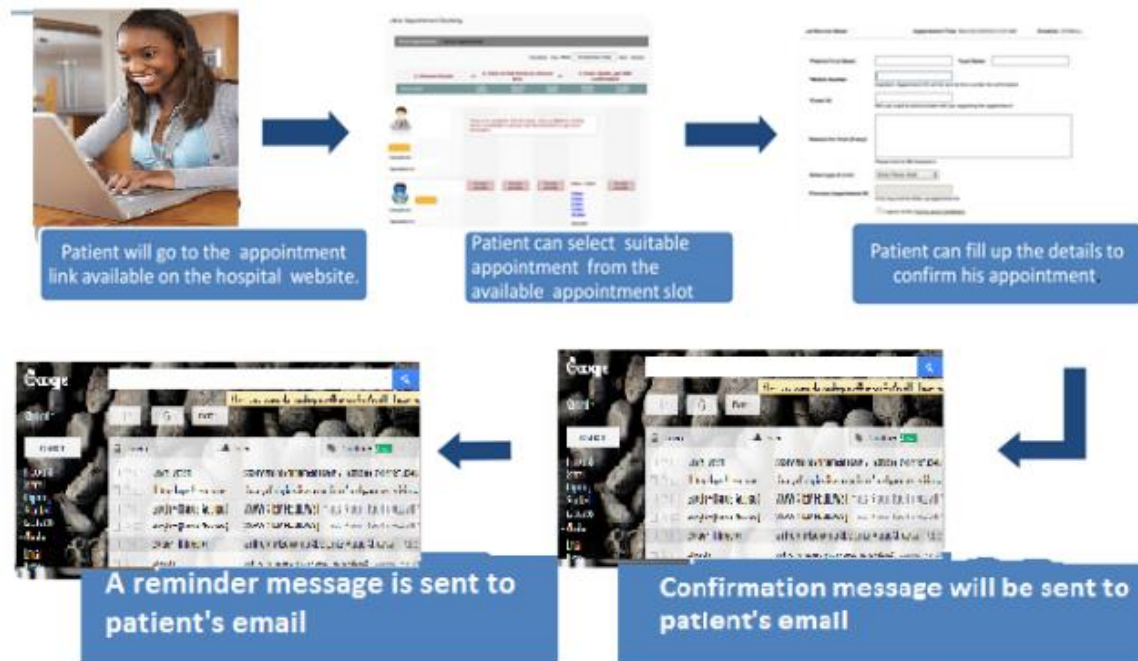


Figure 3 Hospital Interface of HASS

Here, the assistant does all the work for the patient (viewing, updating, creating and cancelling appointments and so on).

The queuing problem is not solved as this can lead to long lines of patients thereby jeopardizing the goal of building the system. Hence, this feature is meant only for 'abnormal' patients such as emergencies in order to avoid queues in the hospital.

2.5.3 Advantages of HASS

Some benefits of HASS include:

- Booking Appointments:** Patients will be sure if they go online they can book appointments rather than waiting on long queues in the hospital without any assurance that you will meet the doctor on that day.
- Tracking of Personal Information:** Patients will be able to track the information the hospital has about them and they can change the information when necessary without going through long procedures
- Organized Schedule:** Doctors will have an organized schedule where they know what exactly they are supposed to be doing at a particular time and who they are meeting on a particular day. The medical staff can reschedule or cancel appointments and the system will simply inform the patients by email.
- Report Generation:** The system will generate reports very easily for example a particular doctor's daily report, patients medical report and so on.

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- v. **Reminders:** Email reminders are sent to patients when their appointment has been confirmed.
- vi. When patients take ownership of their scheduling, they are more likely to keep the appointment and arrive on time.
- vii. **Efficiency:** This system will increase the efficiency of shared data between healthcare practitioners and increased data organization.
- viii. **Cost Reduction:** The system will reduce the operational costs of the healthcare industry generally as it will significantly limit redundancies.

2.5.4 Limitations of the HASS

HASS like all other systems is not perfect, some of its shortcomings include:

- Security: Since the system is over the internet, there is a chance that the system can be hacked and patients records and information can be leaked
- This system does not provide any prioritization towards scheduling the appointments. Prioritization can be done according to age, level of sickness and others.

CHAPTER 3: PROJECT METHODOLOGY

In the course of analysing the problem at hand and looking at the possible scenarios we could get, we came out with analysis and design (due to company privacy policy, we only illustrate a few diagrams). After which, came the implementation. A prototype was produced and modifications made each time a new module was added or an existing one was edited.

3.1 System Analysis

The project began with an analysis of the different scenarios under which the system could be useful. Research was done on existing systems and the possible scenarios in which the system could be implemented were gotten as seen in Chapter 2(section 2.5).

3.2 Requirements Analysis

Requirement analysis is the process of determining user expectations for a new or modified product. With the requirement analysis, we could easily understand the system and how it could fulfil the needs of users of this system. Here I came up with a software requirement specification (SRS) document. The summary of the content of the document is shown below;

3.2.1 Non-functional Requirements

❖ Product Requirements

1. Enhance the Security

The system request password for each registered user in order to maintain privacy as patients will not want unauthorized users seeing their medical history. Also, the password will be stored in an encrypted form.

2. Ease of Use and Consistency

- The system provides simple navigation tools and simple layout for users. Therefore, everyone will know how to use the online system even when they are first-timers.
- The system has been designed in cold colour tone so that it creates a harmonious environment to users. Users will feel comfortable and relaxed when accessing the online system.
- Besides, the system uses appropriate and suitable font size to let users have a great view. Less words and more graphics in the online system enhances the visual effect.
- The system guides the users with messages whenever the user is accessing it. Therefore, users will not feel lost while using the system. If there is any problem, the system automatically displays an error message to alert the users
- The system sends messages by email to patients to inform users when their appointments are confirmed.

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- Users can easily schedule, reschedule or cancel appointments
- Users receive reminder messages as the time for an appointment approaches.

3. Flexibility

The system gives the users control. It does this by making the user feel like they are the ones commanding the system and not the system forcing them to do a particular thing in a particular way.

❖ Organizational Requirements

1) Process Standards

The standard developing tools used in the organization to develop the system was netbeans 7.1, sublime text, with apache tomcat as the server.

2) Implementation Requirement

The implementation of the system was focused on the use of Java, Javascript, HTML, CSS and MySQL languages as basis, with java being the most prominent.

3.2.2 External Requirements

Legislative Requirements

This system was implemented and developed legally. It does not consist of illegal or prohibited data.

3.2.3 Functional Requirements

To get the functional requirements, it is important to know the shared resources in the system. These include:

- Doctors
- Resources – which include room, machine, equipment and so on.

Hence when a patient wants to make an appointment with a particular doctor, the required resource and the doctor have to both be free before the schedule is confirmed.

We have three main users the Patients, Medical Staff and the Admin.

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3.2.4.1 Patient

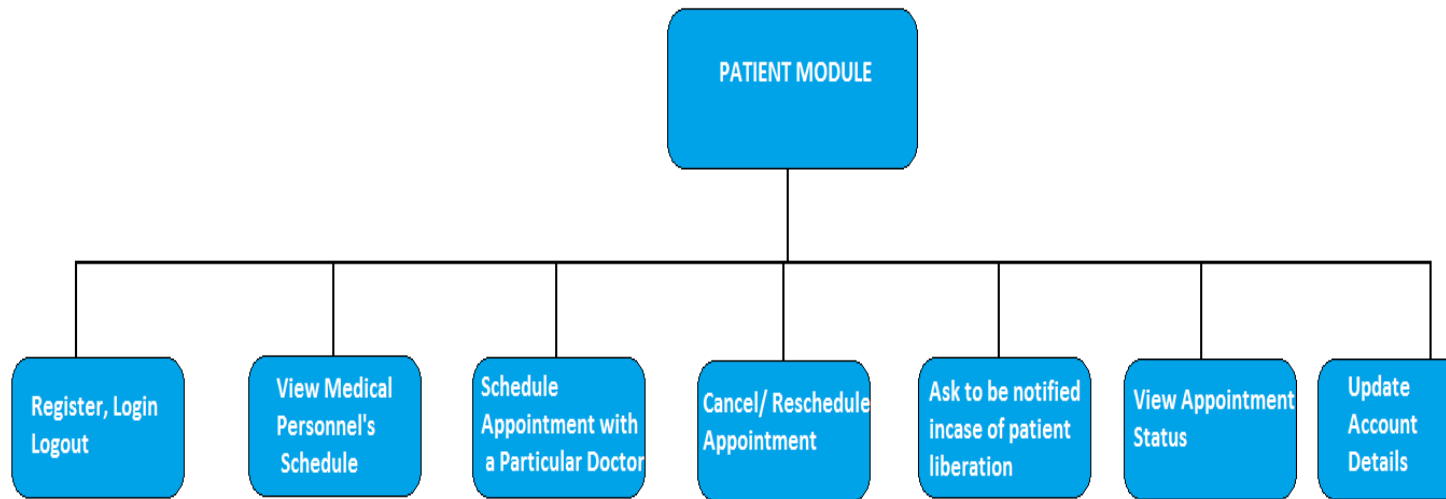


Figure 4 Patient Module of HASS

When the Patient logs on to the system, he/she can do any of the following:

Register, Login, Logout:

The patient entered his/her account details in the hospital management system. This information was entered by the patient when he/she was creating this account such as patient's name, address, phone, email etc. The information will help the hospital know who their patients are and how to contact them. The patient can now login with the username and password that the was gotten during registration.

View Medical Personnel's Schedule: A patient can view medical personnel's schedule in order to choose a schedule that will suit him/her.

Schedule Appointment with a Particular Doctor:

After viewing the personnel's profile, patients can schedule an appointment with him/her. The patient will have to choose the department of the doctor he/she wants and the appointment will be confirmed by the doctor.

Then he/she will wait for a confirmation message, which will display the date and time for the patients appointment. The message will be sent to patients email.

Update Account Details: Patients can also edit the account information for example if his/her address has changed or any information is not correctly written

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View Appointment Status:

Appointment status tells the patient the status of his/her appointment. The status can either be booked (showing the date and time), cancelled or pending.

Cancel/Reschedule Appointments:

The patient can cancel or reschedule his/her appointments.

Patient Use Case Diagram

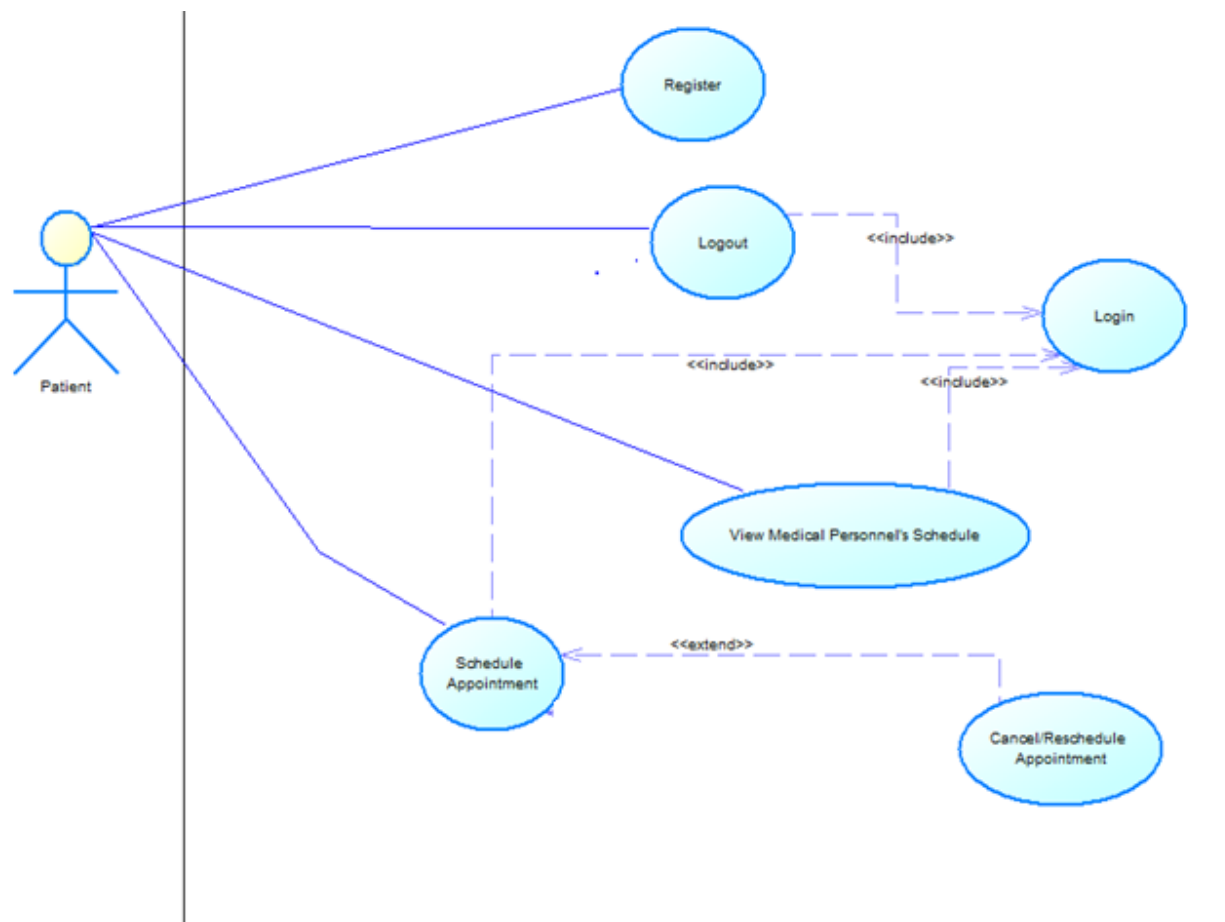


Figure 5 Use case Diagram for Patient

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For the use case above, we have 1 main actor, the patient.

The Table 2 below is the description of the use case for the actor, Patient.

Table 2 Patient Use case Description

Use Case Goal	Description
Register	Patients register by entering some information which includes their usernames and passwords so that they can log in
Login/ Logout	The patients want their information to be private so they need to have usernames and passwords such that unauthorized users cannot access their information
View Medical Personnel's Schedule	Patients can view the schedule of medical personnel's in order to choose which personnel and time will be appropriate for their appointment
Schedule Appointment	After viewing the personnel's schedule they can now book their appointments and wait for approval from the particular personnel
Cancel/ Reschedule Appointment	They can reschedule or cancel appointments in case it doesn't suit them

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3.2.3.2 Medical Personnel

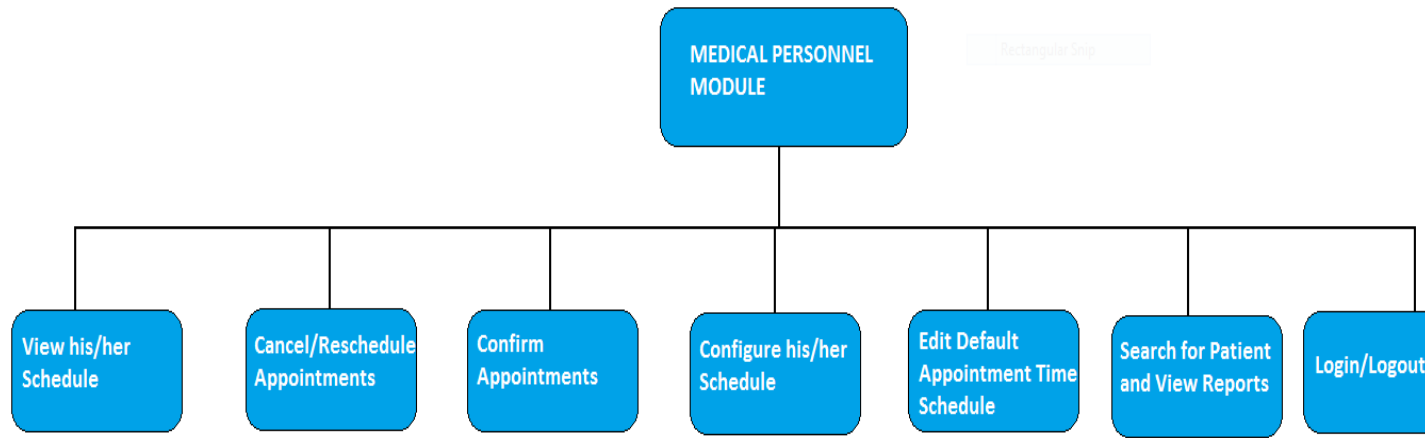


Figure 6 Medical Personnel Module of HASS

Medical Staff can do the following after logging in:

View Schedule:

They can view all appointments made by patients.

Confirm Appointments:

They can also approve pending appointments. They do this by reading the patients details, determining the amount of time a patient can spend and then view their schedule to check for available days.

Each doctor in the hospital will have his own schedule. He/she can add, edit, delete, configure the schedule.

Configure Schedule:

Where the doctors can just define some parameters and the system will confirm the appointments automatically without the doctors having to confirm. Here, the system will act like a filter, filtering unnecessary appointments depending on the parameters defined by the system.

Cancel/Reschedule Appointments:

In case of an emergency or any unforeseen circumstances, employees can cancel or reschedule appointments

Edit Default Appointment Time

The system has a default time per patient. 2 hours but the medical staff has the freedom to change the default time by either increasing or decreasing the default time depending on the amount of time he thinks a patient can spend with the doctor.

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Search for Patients and Generate Reports:

Medical staff can search for a patient details

Medical Personnel Usecase Diagram

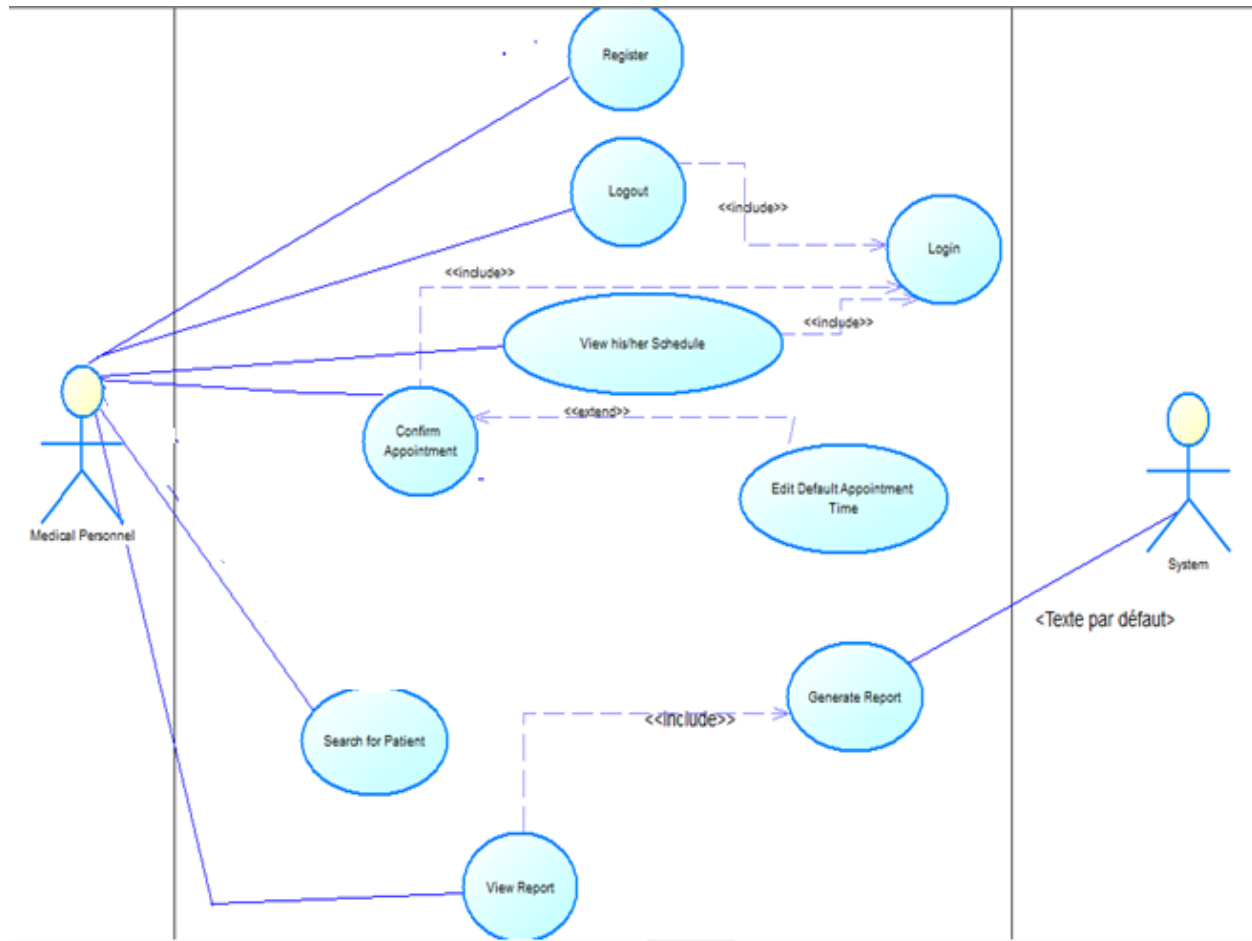


Figure 7 Medical Personnel Usecase Diagram

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Table 3 Medical Personnel Use case Description

Use Case Goal	Description
Register	Medical personnel register by entering some information which includes their usernames and passwords so that they can log in
Login/Logout	A medical staff doesn't want anyone to confirm an appointment or cancel an appointment in his name, hence the need of an account.
View his/her Schedule	He/she can view and edit his/her schedule
Confirm Appointment	Can confirm patient's appointment request. And can change the time for an appointment
Search For Patient	Search for information about a particular patient
View Report	View reports which will be generated by the system
Cancel/Reschedule Appointment	Cancel or reschedule appointments in an unforeseen circumstance
Edit Default Appointment Time	The system has a default time per patient (2 hours) but the medical staff will have the freedom to either change the default time depending on the amount of time patient spends with doctor

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3.2.3.3 Admin Module

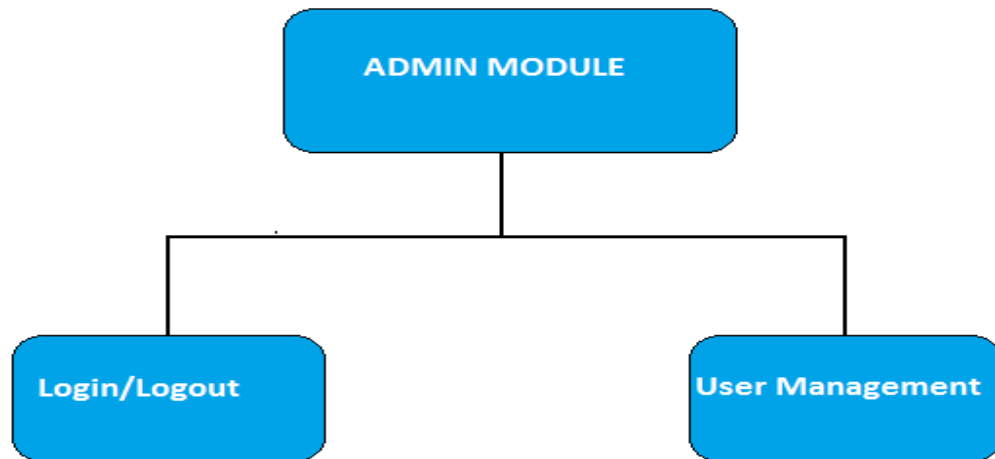


Figure 8 Admin Module for HASS

The main function of the admin is user management. Where he manages all patients and medical staff.

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3.3 System Design

3.3.1 Activity Diagram

- Patient Requesting Appointment

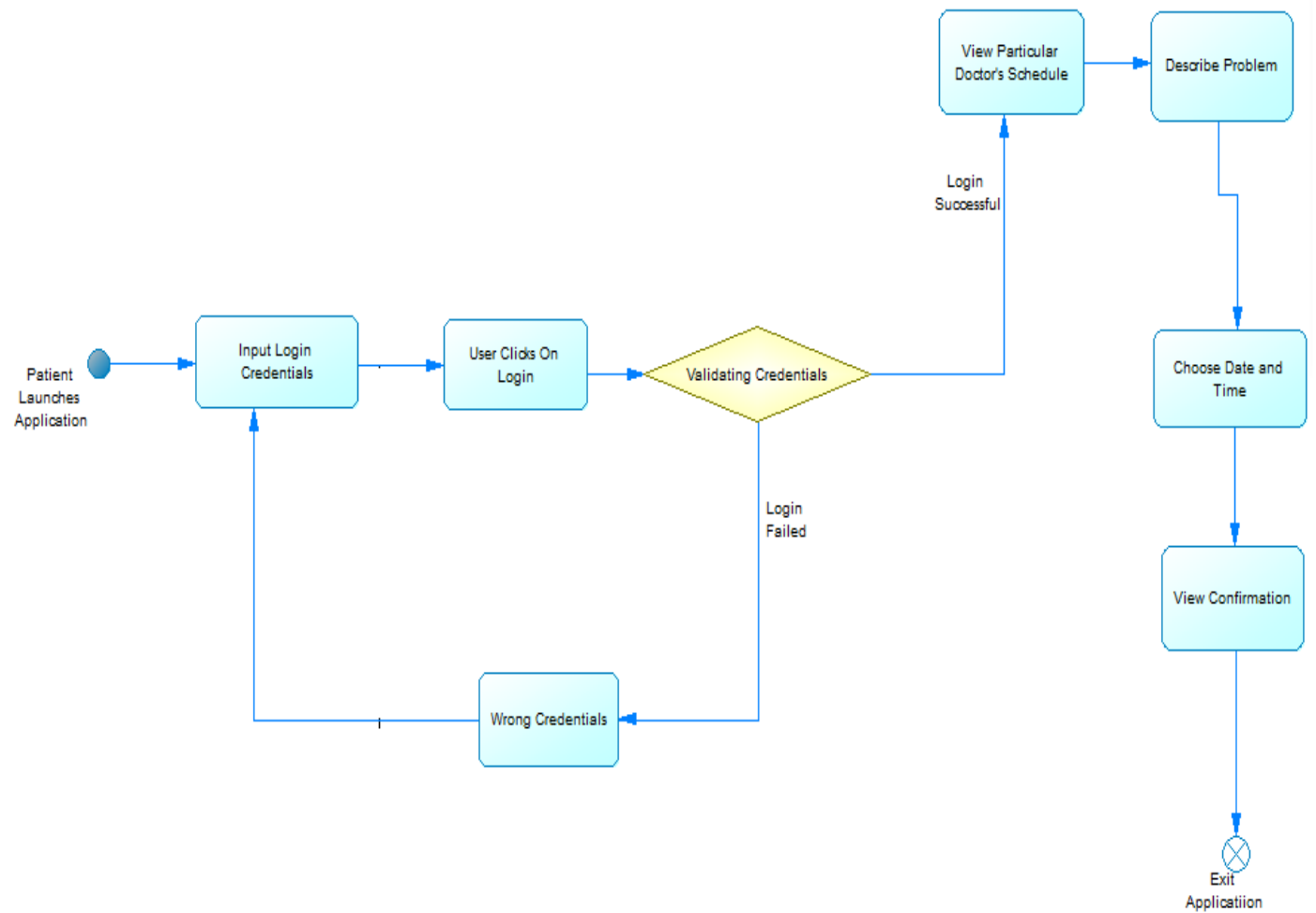


Figure 9 Patient Appointment Booking Activity Diagram

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DOCTOR CONFIRMING APPOINTMENT

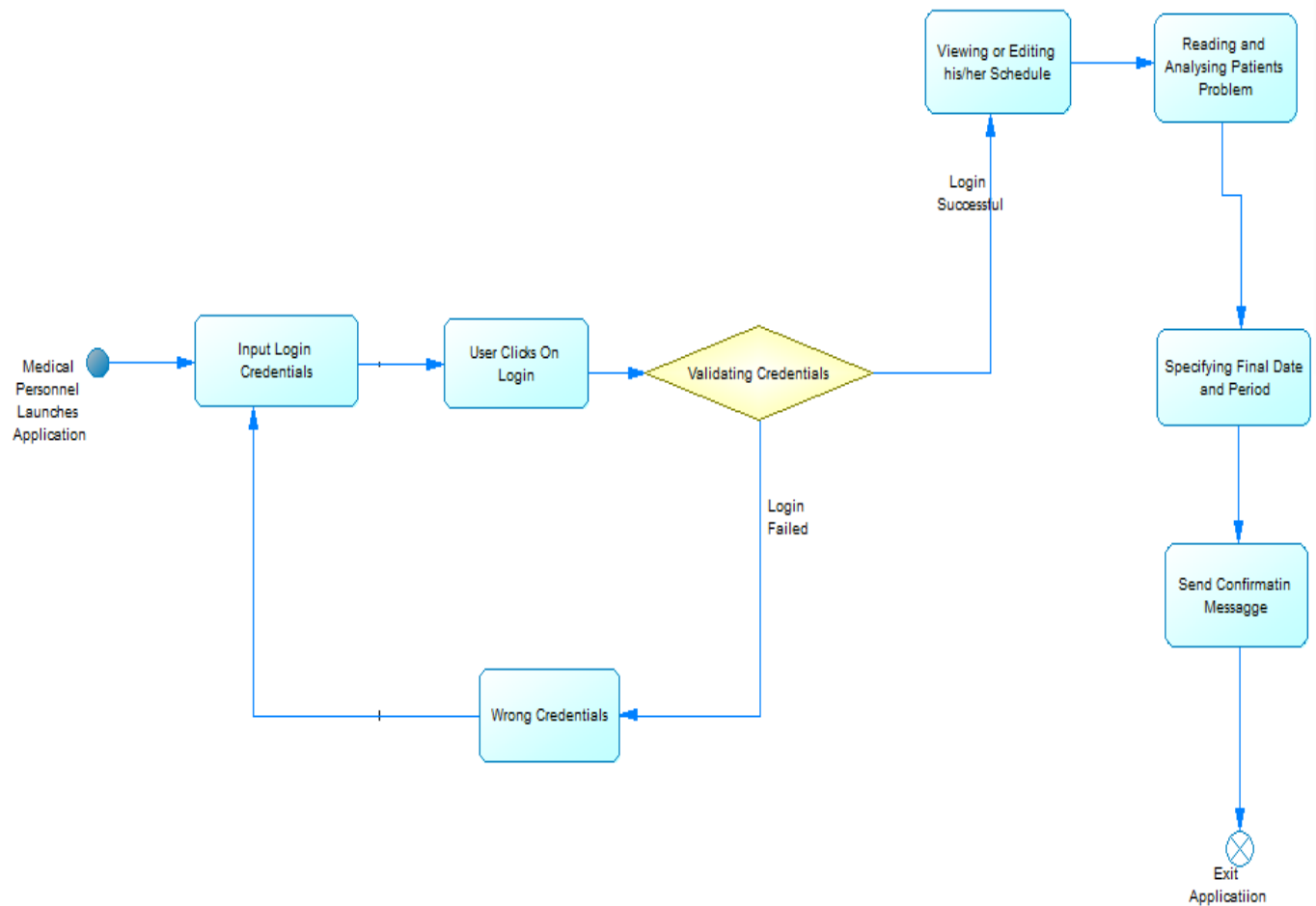


Figure 10 Doctor Confirm Appointment Activity Diagram

The activity diagrams in Figure 9 and Figure 10 describe the steps of events the user goes through to book an appointment. The patient logs in. The patient enters his login credential and when they are validated he/she chooses a desired doctor, describes his problem, chooses date and time and books the appointment. When confirmation is sent patient can view the confirmation.

When doctor succeeds to login, he can view the pending appointments and confirm them.

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4.3.2 ER(ENTITY RELATION) DIAGRAM

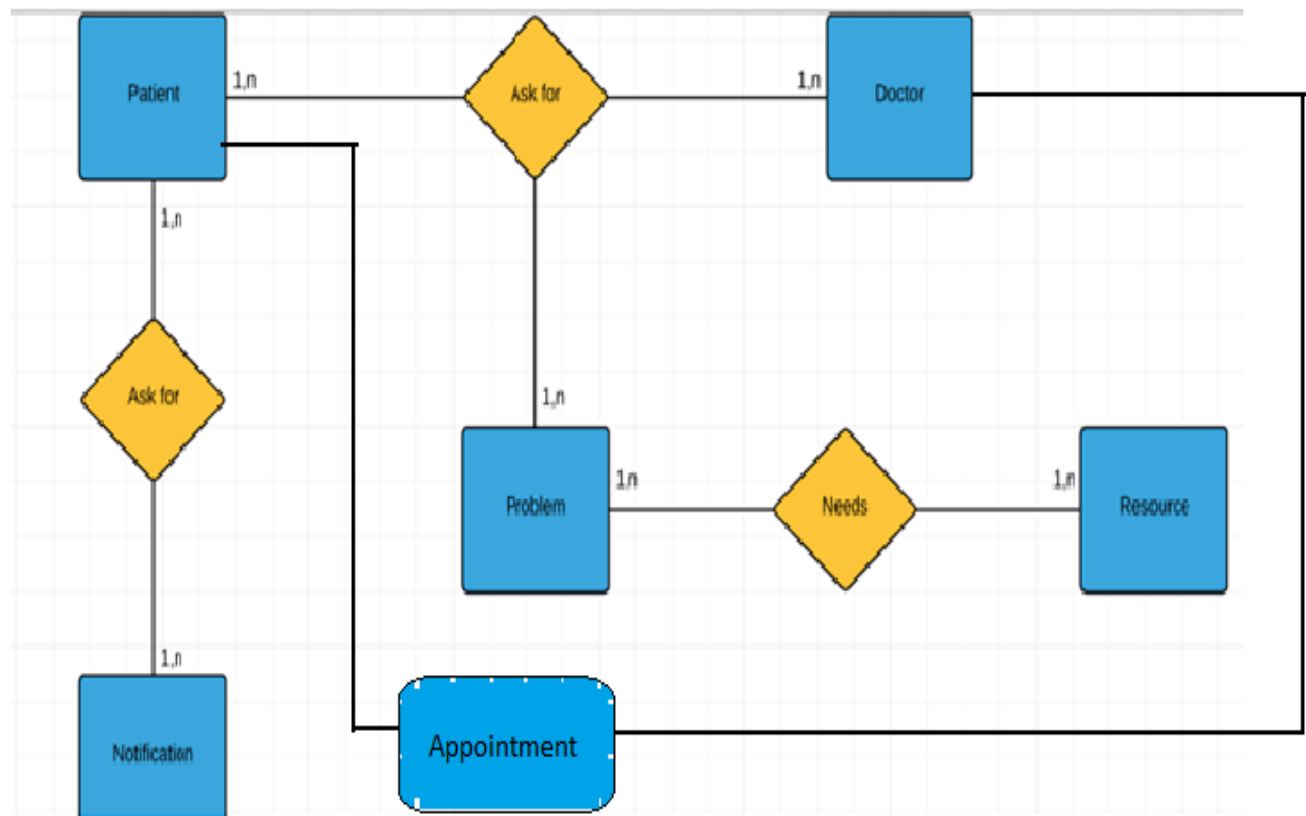


Figure 11 ER Diagram of HASS

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4.3.3 RELATIONAL DIAGRAM

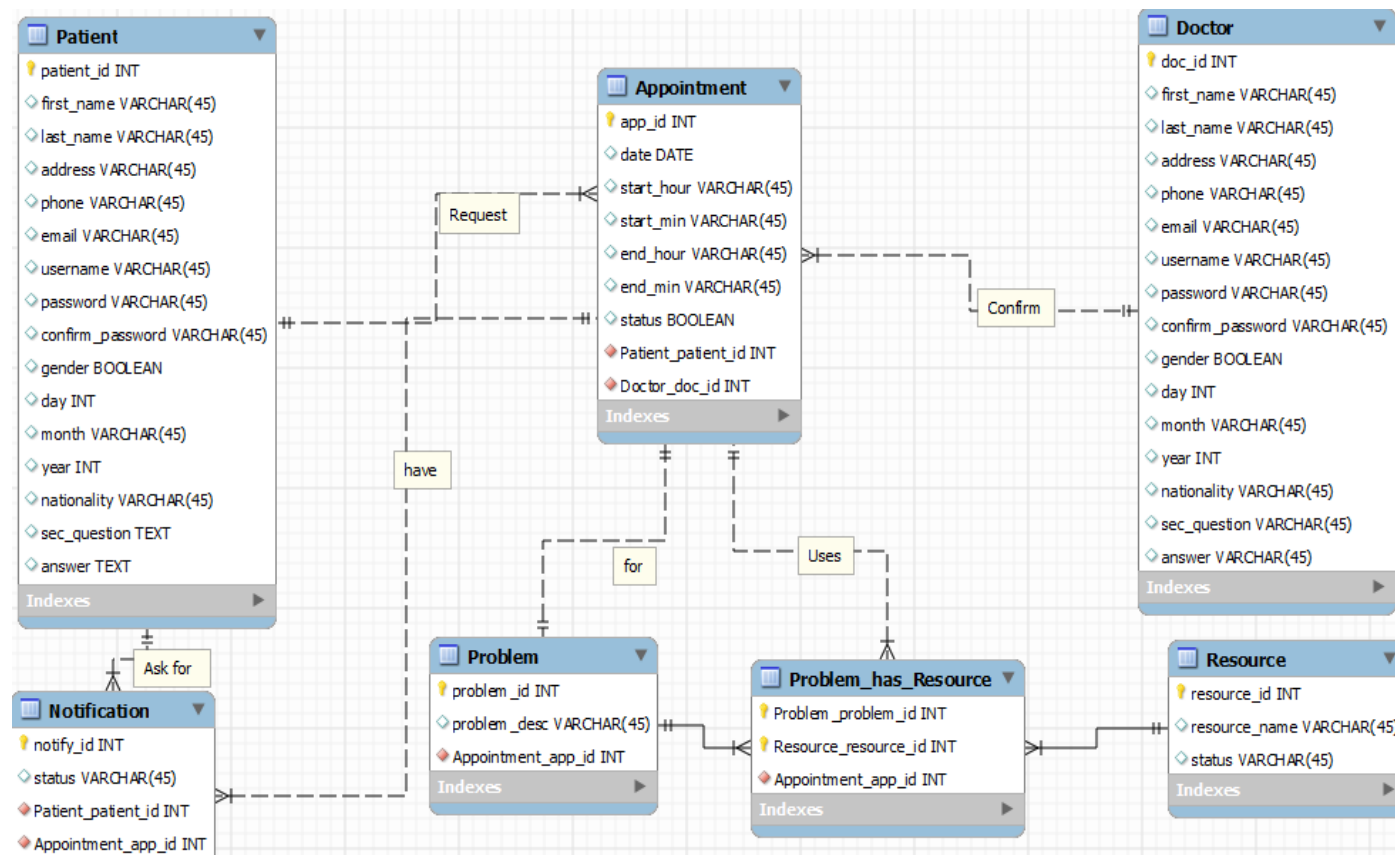


Figure 12 Relation Diagram of HASS

4.4 Implementation

The system was implemented using the following tools and programming languages:

Table 4 Tools used in implementation

Tool/Language	Use
Mdal	Framework
Netbeans 1.7	Programming Environment
Apache Tomcat	Database Servers
Navicat Premium	Database Administration Tool
Java, Javascript, Html, Css, Mysql	Programming Languages
Mysql Workbench, PowerAMC	Database Design Tools

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CHAPTER 4: RESULTS

The internship ended well as the HASS was developed. Both the web and the desktop applications were completed. On both of these applications the following were successfully developed:

- The patient can
 - Login
 - Select a department in the hospital and a doctor of their choice
 - View a calendar which shows the doctor's schedule for a day, a week or a month.
 - Choose an appropriate time for his/her appointment which is free on the doctor's schedule.
 - Book the appointment which is marked as pending
 - Can reschedule the appointment or cancel it
 - View the details of appointments he/she has ever had
 - Edit his/her personal information that the hospital has.
 - View appointment status
- The doctor can
 - Login
 - Confirm or reschedule an appointment
 - View patient details
 - Generate reports
 - Patient Appointment Report
 - Weekly Appointment Report
 - Daily Appointment Report
- In the desktop application, the assistant can do all what the patient can do.
- The system can Send emails to tell the patient the status of his/her appointment

Megasoft plans to use this system as a module in a hospital management system that is currently under development.

Screen shot can be seen in the Appendices.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Evaluation of internship experience

My internship at Megasoft has not just been a very interesting and challenging experience but has also acted as an eye-opener to me. It has opened my eyes to see a lot of things differently not only in the software engineering world but in the rest of the world too.

Working with a completely new and proprietary framework (mdal) was a priceless experience as I learnt not to rely on google for every little problem I had. It required me to read a lot of documentation and learn how to ask for help from other developers when I needed it. Professionally, my skills in java, javascript,html and css improved drastically. I learnt firsthand that programming is just a small part of the software development process; analysis, design and to certain extent team collaboration are very essential. In addition, this experience helped decide the field in software engineering I will love to specialize in, when studying for my masters degree.

On the human side, I discovered that working with a different language and in a completely new environment was not as challenging as I had imagined. Given that all documentation and technologies developed in Megasoft are in French, which I had basic knowledge in.

Also, I learnt that engineering is as important as other fields in the industry. The company needs a combination of diverse skill sets like marketing and sales departments to be able to run successfully. Hence, helping me to start appreciating other people in fields other than engineering.

Summarily, these last 5 months, transformed me completely. I learned a lot about time management, organization, confidence, punctuality and respect. I come back from this internship very mature not only in software engineering but in life as a whole.

5.2 Future Works

The following will be added to the system to make it more user friendly, efficient and flexible:

- Reminders and confirmation messages will be sent to patient's to mobile phone
- In order to make sure doctors and resources are highly used, we shall have patients on a waiting list. Patients will be able to choose whether or not they should be notified when a patient does not show up or a patient cancel's his appointment. If he/she agrees to be notified then he/she is placed on the waiting list for that day.
- To make the system flexible, the doctor should be able to configure his schedule. Where the doctors can just define some parameters and the system will confirm the appointments automatically without the doctors having to confirm. Here, the system will act like a filter, filtering unnecessary appointments depending on the parameters defined by the system.

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5.3 Recommendations

To Megasoft

Megasoft should translate all the documents, user guides and create english version of their softwares so that anglophones will not have to stress up too much given that Cameroon is a bilingual country.

They should also make their framework, mdal, opensource so that other developers can contribute in developing it and other organizations can also use it.

To FET Students

Language should not be a barrier for anyone to accomplish their dreams. You can work or study anywhere so far as you make up your mind and you are willing to persevere.

Internship is a wonderful experience where you learn a lot, so I advise all FET students to try to do internships during holidays. They shouldn't wait for the school to impose it on them before they do it.

To crown it all, I learnt that life is not a bed of roses, you don't have to be good at what you do to keep a job, you have to be great. Hence, I encourage my fellow school mates to strive for greatness in whatever they do.

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APPENDICES

APPENDIX A: SCREENSHOTS OF WEB BASED APPLICATION FOR HASS

My CV fo... Inbox - in... Google T... Android ... Color - St... Problem I... Options Servlet C... Conn... X

de.connect X age of black woman sitting on laptop → ☆ | 📁 | 🌐

★★★★★★★★

GESTION RENDEZVOUS

Entrez vos paramètres de connexion

login system

password ●●●●

Valider

[Mot de passe oublié?](#)

Figure 13 Patient login in HASS web

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Figure 14 Patient Selects Appointment in HASS web

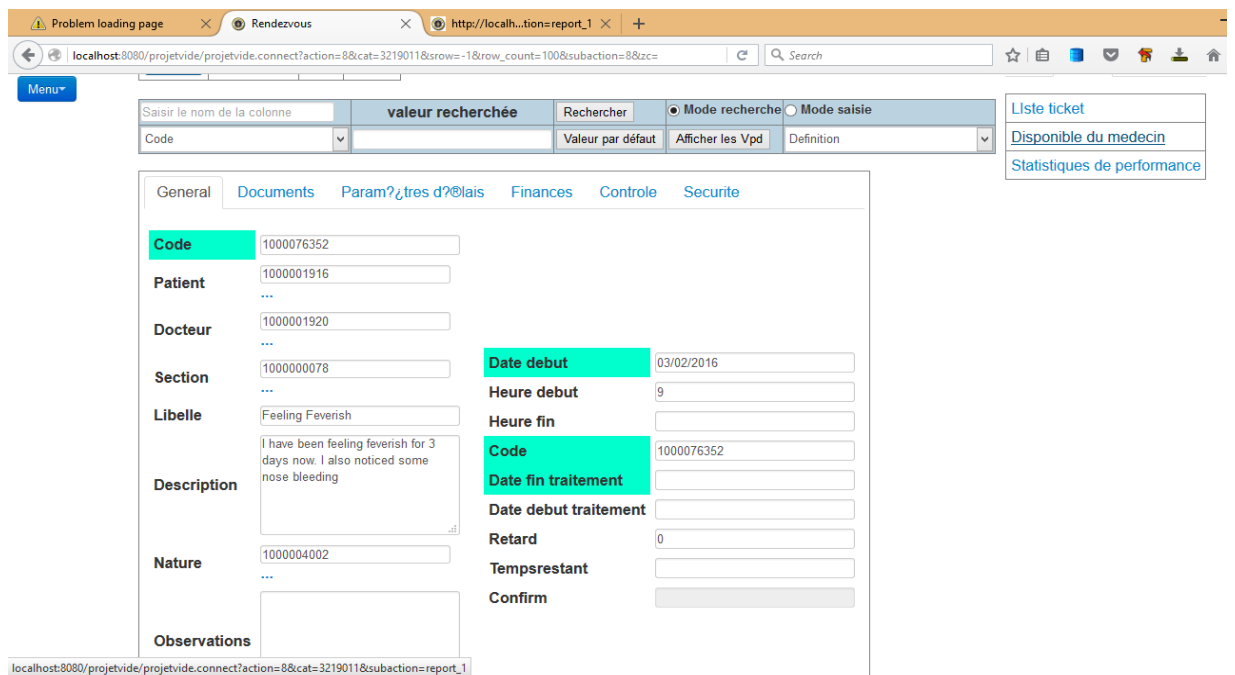


Figure 15 Patient Fills Appointment Details in HASS(web)

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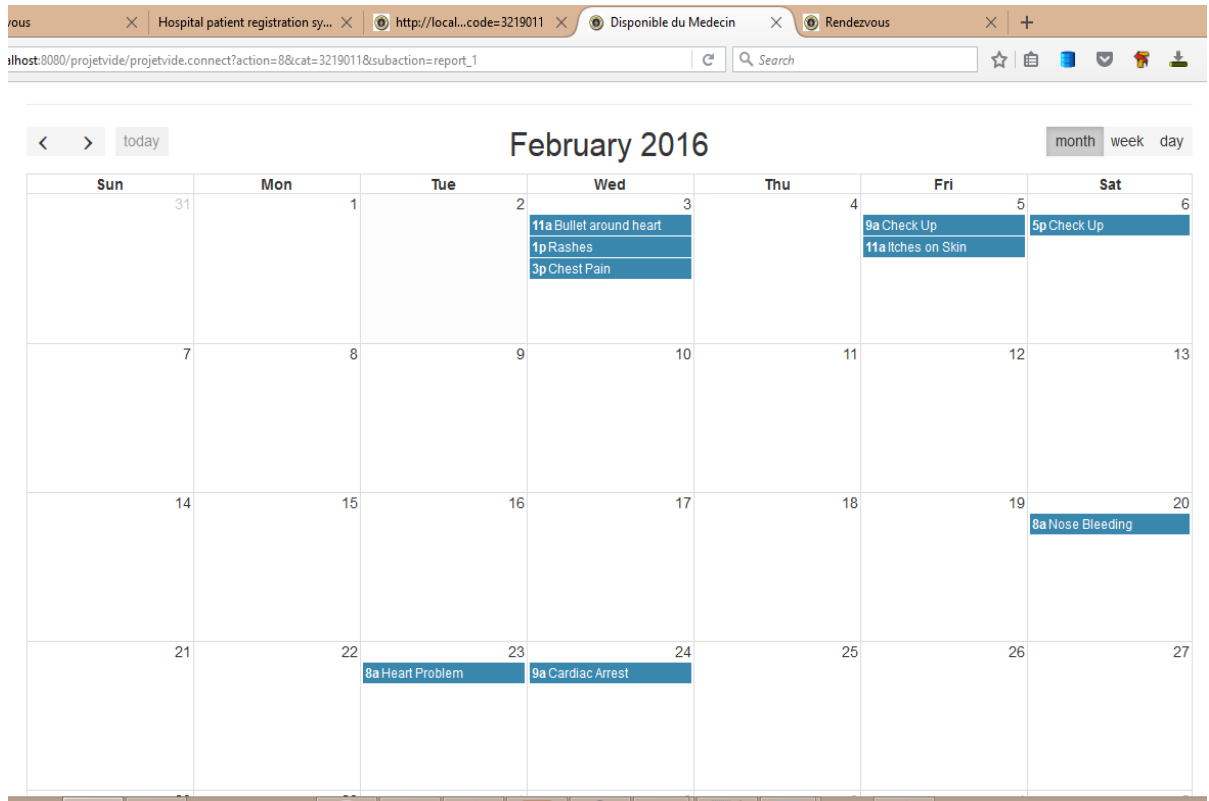


Figure 16 Patient Views Doctor's Monthly Schedule

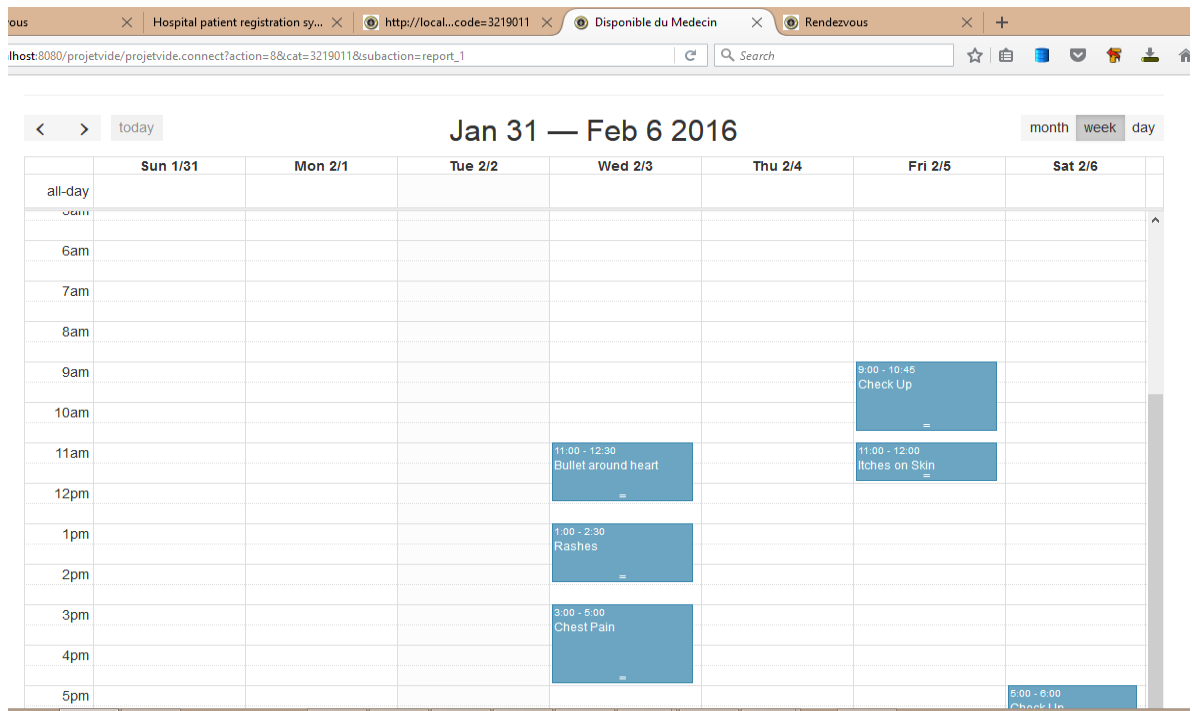


Figure 17 Patient Views Doctor's Weekly Schedule

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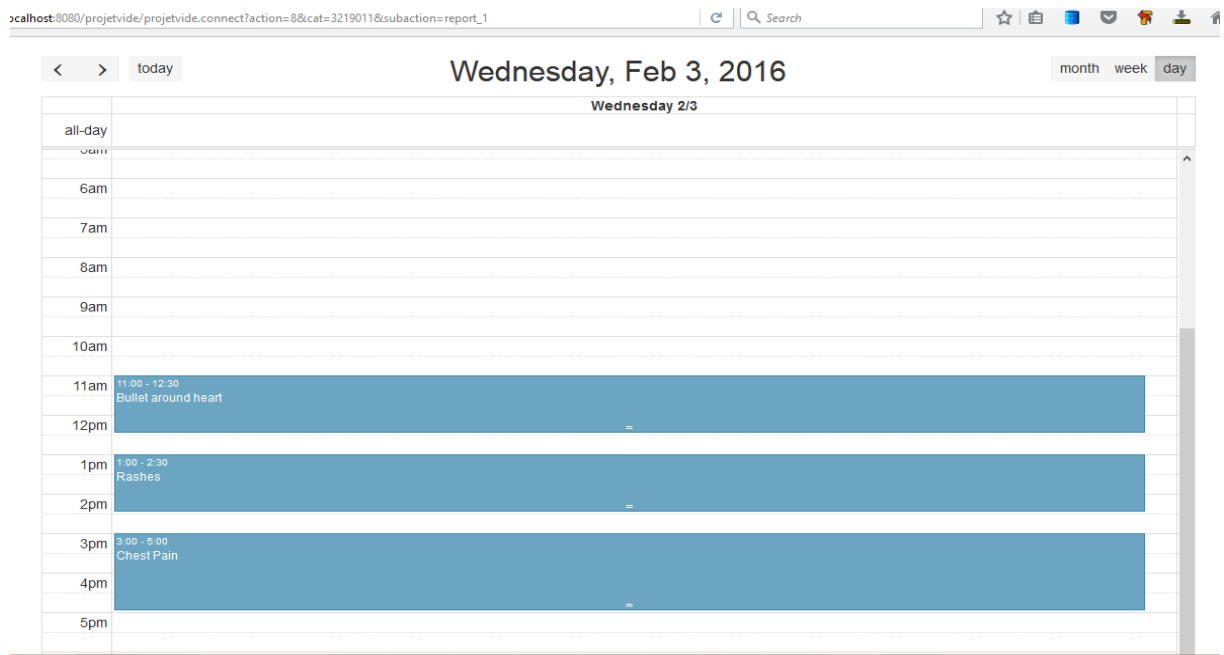


Figure 18 Patient Views Doctors Daily Schedule

N°		MARQUE	Choisir	Details	Supprimer	Code	Section	Libelle	Description	Date debut	Confirm
1	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076327	1000000078	FEVER	Feeling Feverish	21/02/2016	0
2	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076330	1000000079	Watering Eyes	Eyes are watering	02/02/2016	0
3	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076331	1000000079	Pain in the eye	I feel some pain in my eyes	26/02/2016	1
4	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076338	1000000080	Heart Problem	Pains around the heart	23/02/2016	1
5	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076339	1000000080	Bullet around heart	Bullet around the heart: Shot at 8:00 this morning	03/02/2016	1
6	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076340	1000000080	Cardiac Arrest	Serious Heart attack	24/02/2016	1
7	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076341	1000000080	Check up	She will have check up for her operation	25/01/2016	1
8	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076342	1000000080	Heart Transplant	Transplant for the heart	24/01/2016	1
9	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076343	1000000080	Cardiac Problem	Checking up on cardiac problem	25/01/2016	1
10	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076351	1000000078	Nose Bleeding	Nose Bleeding Around the Heart	20/02/2016	1
11	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076360	1000000078	Rashes	Rashes have been coming out on my skin for about a week now	03/02/2016	1
12	<input type="checkbox"/>		Choisir	Details	Supprimer	1000076361	1000000080	Chest Pain	Have been having chest pain for 2 weeks now	03/02/2016	1

Figure 19 Doctor Views All Patients Who Book Appointment on HASS Web

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APPENDIX B: HOSPITAL INTERFACE APPLICATION (DESKTOP APPLICATION) FOR HASS

Ms crm

Demarrer Infrastructure semantique Outils Etats Traitements

Remonter Envoyer sms Personne Projet Rendezvous Courrier Document Categorie document Unite

Rubrique : Rendezvous : Si vous voulez choisir une autre rubrique, passez par le menu Demarrer

Pour créer Rendezvous Cliquez sur le bouton nouveau. Pour rechercher Rendezvous Faire :

1. choisir un attribut 2. choisir un critere 3. ecrire la valeur du critere

Cat action LIKE

Requete Groupement 4. cliquer sur le bouton rechercher

Critères de recherche Critères de groupement

Données

P	Code	Section	Libelle	Description	Date debut	Confirm	Livrable	Nature	Projet	Code partenaire	Etat	Code parent	Priorite	Date ouverture	Date debut traitement	Date fin
1	100007632	CONSULT	FEVER	Feeling Feversh	21/02/201	0	0	urgent	Defaultp		1	0		07/01/2016	11/01/2016	25/02/2016
2	100007633	OPHTHALA	Watering Eyes	Eyes are watering	02/02/201	0	0	urgent	Defaultp		1	0		11/01/2016		06/02/2016
3	100007633	OPHTHALA	Pain in the eye	I feel some pain in	26/02/201	1	0	urgent	Defaultp		1	0		11/01/2016		28/02/2016
4	100007633	CARDIAC	Heart Problem	Pains around the	23/02/201	1	0	urgent			1	0				28/02/2016
5	100007633	CARDIAC	Bullet around the	Bullet around the	03/02/201	1	0				0					21/02/2016

Record 11 of 17

Details Modifier Nouveau Supprimer Imprimer

Figure 20 Doctor Logs in and Selects Appointment

Item=>Gestion Rendez-vous=>Rendezvous system. F4=OK F8=Enregistrer F7=Enregistrer Et Insérer F3=Selectionner F9=Afficher/CacherTraitementsEtEtats F0=Aggrandir/Reduire grille

Etr Aide Relations Modeles Structure Listes

Generer sur ce modele Basculer vers saisie Rechercher Filtrer Af Vpd

Colonne où rechercher Valeur recherchée

Cat action

P	Code	Section	Libelle	Description	Date debut	Confirm	Livrable	Nature	Projet	Code partenaire	Etat	Code parent	Priorite	Date ouve
7	100007634	CARDIAC	Check up	She will have che	25/01/201	1	0				0			
8	100007634	CARDIAC	Heart Transplan	Transplant forth	24/01/201	1	0				0			

General Documents Param?ctres d'@lais Finances Controle Securite

Code 1000076342 Date debut 24/01/2016

Patient NJINANG JEAN CLAUDE Heure debut 13:00:00

Docteur GEORGE NEBA Heure fin 15:00:00

Section CARDIAC Code 1000076342

Libelle Heart Transplant Date fin traitement 01/02/2016

Nature Date debut traitement

Observations Retard 0

Etat Tempsrestant

Confirm

Relations

F3 F4 F7 F8 F5 F9 F0 >= <= Calculer Masse Marquer

First Prior Next Last Insert Delete Post Cancel Ditto Save Refresh

Ok Record 8 of 17 Annuler

Figure 21 Doctor Confrms Particular Patients Appointment